

What is claimed is:

*sub A9*

1. A metal conductor having a cured coating of about 2.5  $\mu\text{m}$  to about 500  $\mu\text{m}$  thickness which coating has a dielectric dissipation factor (60Hz, 24°C) of lower than about 0.05 and is a radiation-cured coating formulated from a coating composition comprising:
  - a) an acrylate functional urethane oligomer having a hydrocarbon backbone;
  - b) at least one mono- or polyfunctional diluent; and optionally
  - c) a photoinitiator.
2. A metal conductor according to claim 1, wherein the metal is iron, copper, aluminum or silver.

*A9*

3. A metal conductor according to claim 2, wherein the metal is aluminum, copper or silver.

*ins A10*

4. ~~A metal conductor~~ according to claim 1, wherein the cured coating has an elongation at 25°C of greater than about 50% as a 25  $\mu\text{m}$  thin cured coating.

*A10*

5. ~~A metal conductor~~ according to claim 4, wherein the cured coating has at least one Tg of below 20°C as measured by the peak of the  $\tan \delta$  curve in a

DMA analysis at 1 Hz.

ins A10 6. ~~A metal conductor~~ according to claim 1, wherein the cured coating has a dissipation factor at 60 Hz at 150°C of lower than about 0.2.

ins A10 7. ~~A metal conductor~~ according to claim 1, wherein the cured coating is formulated from the coating composition which further comprises an adhesion promotor.

ins A10 8. ~~A metal conductor~~ according to claim 1, wherein the cured coating is a radiation-cured coating formulated from components comprising:

- about 20 wt.% to about 80 wt.% of an acrylate functional urethane oligomer having a hydrocarbon backbone;
- about 20 wt.% to about 80% of one or more mono- or polyacrylate functional monomers and optionally;
- about 1 wt.% to about 10 wt.% of one or more light sensitive radical generating compounds; and optionally
- about 0.2-5 wt.% of an adhesion promotor.

ins A10 9. ~~A metal conductor~~ according to claim 1, wherein the cured coating is a coating cured by irradiation with light with a wavelength between about 200  $\mu\text{m}$  to about 700  $\mu\text{m}$ , and in the

photoinitiator is present in about 1 wt.% to about 10 wt.% of the coating composition.

*Ins A10* 10. ~~A metal conductor~~ according to claim 1, wherein the cured coating is a coating which is formulated from components comprising:

- a) about 30 wt.% to about 65 wt.% of an acrylate functional urethane oligomer having a hydrocarbon backbone;
- b) about 20 wt.% to about 70 wt.% of at least two acrylate functional diluents, one of said acrylate functional diluents being a monoacrylate and one of said acrylate functional diluents being a polyacrylate functional compound;
- c) about 1 wt.% to about 10 wt.% of one or more light sensitive radical generating compounds; and
- d) about 0.2 wt.% to about 5 wt.% of an acid functional adhesion promotor.

*Ins A10* 11. ~~A metal conductor~~ according to claim 6, wherein the adhesion promotor is an acid functional compound.

*Ins A10* 12. ~~A metal conductor~~ to claim 1, wherein the cured coating further comprises about 0.2 wt.% to about 5 wt.% of a pigment or a dye.

13. ~~A metal conductor according to claim 1, wherein~~  
~~the cured coating has a thickness of about 10  $\mu\text{m}$~~   
~~to about 100  $\mu\text{m}$ .~~

14. ~~A metal conductor according to claim 1, wherein~~  
~~the cured coating has a dielectric constant lower~~  
~~than about 5.~~

15. ~~A metal conductor according to claim 1, wherein~~  
~~the cured coating has a dielectric dissipation~~  
~~factor lower than about 0.05 (60Hz, 24°C) after hot~~  
~~oil exposure (150°C).~~

16. ~~A metal conductor according to claim 1, wherein~~  
~~the coating is formulated from components~~  
~~consisting essentially of:~~  

- a) about 30 wt.% to about 65 wt.% of an acrylate functional urethane oligomer having a hydrocarbon backbone;
- b1) about 10 wt.% to about 50 wt.% of a mono-acrylate functional diluent;
- b2) about 5 wt.% to about 40 wt.% of a poly-acrylate functional diluent;
- c) about 2 wt.% to about 7 wt.% of at least one photoinitiator;
- d) about 0.2 wt.% to about 4 wt.% of adhesion promotor; and

e) about 0.2 wt.% to about 2 wt.% of a pigment.

WSA, 10 17. A metal conductor according to claim 1, wherein  
said hydrocarbon backbone is fully saturated.

18. A radiation-curable coating composition  
comprising:

- a) an acrylate functional urethane oligomer  
having a hydrocarbon backbone;
- b) one or more mono- or polyfunctional diluents;  
and optionally
- c) one or more light sensitive radical  
generating compounds;

which coating when cured with radiation has a  
dielectric dissipation factor at 60 Hz at 24°C of  
lower than about 0.05, a dissipation factor at 60  
Hz at 150°C of lower than about 0.2, and an  
elongation at 25°C of a 25  $\mu$ m thin cured coating of  
at least about 50%.

19. A radiation-curable coating composition according  
to claim 18, wherein said hydrocarbon backbone is  
fully saturated.

Sub A12 20. A radiation-curable coating according to claim 16,  
wherein the urethane oligomer is the reaction  
product of a hydrocarbon polyol, a polyisocyanate  
and an hydroxyfunctional endcapping monomer.

21. A radiation-curable coating composition according to claim 20, wherein said polyisocynate is an aliphatic polyisocyanate.

22. ~~A metal conductor according to claim 8, wherein said one or more monomers is a mono- or polyfunctional alkylacrylate or methacrylate based monomer.~~

23. A method of making a metal conductor with a cured coating of about 2.5  $\mu\text{m}$  to about 500  $\mu\text{m}$  thickness, which cured coating has a dielectric dissipation factor (60Hz, 24°C) of lower than about 0.05 comprising the steps of:

- providing a metal conductor;
- coating said metal conductor with a radiation-curable coating composition which comprises:
  - an acrylate functional urethane oligomer having a hydrocarbon backbone;
  - at least one mono- or polyfunctional diluent; and optionally
  - a photoinitiator.

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